

CLAIMS

What is claimed is:

- 5 1. A method for forming a MOSFET, said method comprises:
 - providing a wafer, wherein said wafer comprises a substrate;
 - forming a trench in said substrate;
 - forming a gate on a bottom of said trench;
 - 10 forming a spacer on both sides of said gate and filling of said trench;
 - implanting a ion into said substrate which is on both sides of said spacer;
 - proceeding a first rapid thermal process to form a source/drain region and a source/drain extended region in said substrate;
 - 15 forming a metal layer on said gate, said spacer, and said source /drain region;
 - proceeding a second rapid thermal process to form a silicide layer on said gate and said source/drain region; and
 - 20 removing said metal layer.
2. The method according to claim 1, wherein said gate comprises a gate oxide layer.
- 25 3. The method according to claim 1, wherein a depth of said trench is 50% to 80% of a thickness of said gate.
4. The method according to claim 1, wherein said ion is a

N type ion.

5. The method according to claim 1, wherein said ion is a P type ion.

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6. The method according to claim 1, wherein said a material of said metal layer is titanium.

7. The method according to claim 1, wherein said a material of said metal layer is cobalt.

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8. The method according to claim 1, wherein said a material of said metal layer is platinum.

9. A method for forming a MOSFET, said method comprises:

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providing a wafer, wherein said wafer comprises a substrate;

forming a trench in said substrate;

forming a gate on a bottom of said trench, wherein said gate

20 comprises a gate oxide layer;

forming a spacer on a sidewall of said gate and said gate oxide layer and filling of said trench;

implanting a ion into said substrate which is on both sides of said spacer;

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proceeding a first rapid thermal process to form a source/drain region and a source/drain extended region in said substrate;

forming a metal layer on said gate, said spacer, and said source /drain region;

proceeding a second rapid thermal process to form a silicide layer on said gate and said source/drain region; and removing said metal layer and proceeding a third rapid thermal process.

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10. The method according to claim 9, wherein a depth of said trench is 50% to 80% of a thickness of said gate.

11. The method according to claim 9, wherein said ion is a N type ion.

12. The method according to claim 9, wherein said ion is a P type ion.

13. The method according to claim 9, wherein said a material of said metal layer is titanium.

14. The method according to claim 9, wherein said a material of said metal layer is cobalt.

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15. The method according to claim 9, wherein said a material of said metal layer is platinum.

16. The method according to claim 9, wherein a material of said spacer is silicon nitride.

17. The method according to claim 9, wherein a temperature of said first rapid thermal process is about 950°C to 1050

C.

18. The method according to claim 9, wherein a width of said trench is about $0.2 \mu\text{m}$ to $0.35 \mu\text{m}$.

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